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Final Report Energy and Economic Development

A Report on the Efforts of Ten Localities
Selected to Document the Relationship Between
Energy Strategies and Economic Development

for

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Office of Community Planning and Development
Energy Division

by

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EXECUTIVE SUMMARY

Energy and economic development is very much a local activity affecting every citizen, business, and industry in the community. It affects jobs, the cost of goods and services, and the quality of life. How well a community manages its energy resources affects the cost and level of community services. For these reasons, local government can provide a strong incentive to other sectors of the community by taking a leadership role in articulating its energy policies, establishing reasonable and sound policies, clearly identifying the linkage between energy use and community activities, and implementing a wide array of strategies to minimize energy demand and maximize local contributions to energy supply.

To assist local government in establishing this leadership role, the Department of Housing and Urban Development (HUD), Office of Community Planning and Development (CPD), Energy Division, initiated a project which would aid in linking energy concerns with community and economic development activities. Additionally, the project would develop and document strategies and transfer them to nearby communities.

This report summarizes the energy strategy documentation of ten communities that participated in this HUD sponsored project. The authors of this report have included some generalizations about

community energy and economic development strategies. This was done to provide a context for presenting the community energy strategies and in general, making this report more useful to other communities. This report describes the broad range of actions that local government, citizens, business and industry undertook to increase local energy supply, reduce energy consumption, and stimulate the local economy. It does not provide a detailed description of all strategies that were employed by local governments, but it does provide a representative sample of energy and economic development strategies that have been tried by the ten participating communities. It includes those strategies that have been shown to work to a greater or lesser degree and that appear to be transferable in whole or in part to other communities. The transfer activities, particularly the required "sharing" with neighbors has not been studied, but was deemed to be useful in almost every case.

The complexity of local government management functions and the ability to implement strategies vary greatly across the country. Thus, many strategies described in the individual community reports include some simplifying assumptions. These simplifying assumptions should not invalidate the usefulness of the information provided. For specifics regarding individual community initiatives, the community's final report may be reviewed at the HUD Energy Division. Lastly, this report does not provide a process for selecting among the range of strategies that are available to local government. It does provide however,

a starting point by identifying the relationship between a specific energy strategy and the benefits that can accrue to a community with successful implementation.

Most community energy strategies and policies focus on reducing the outflow of dollars associated with the import of fuels. Such fuels often represent 100% of the energy consumed in the community. It is not surprising that the economic loss associated with the high cost of imported fuels is viewed as a major factor that limit community economic growth. It is evident that any monies saved by reducing fuel imports would enhance local economic growth by increasing local sales of goods and services or savings. The foregoing was the major concern of many of the communities that received technical assistance funding from the Department of Housing and Urban Development (HUD), to finalize and document energy strategies relating to economic development activities. Major implications of the community reports deserve mention here.

Fuel Dollar Savings— The magnitude of the fuel dollars saved depends on the fuel mix and the amount of fuel imported. A community that imports 100% of its fuel and reduces those imports by 20% will improve the community cash flow to a greater degree than a community that imports 75% of its fuel and saves the same percentage. The amount of money retained in the community as a result of displacing imports can be lessened because the replacement technology may cause dollar outflows.

In nearly all participating communities there were indications

of energy savings. In most of the cases the savings could not be quantified exactly.

Employment Implications— In energy projects, particularly ones involving construction, not all of the jobs created will be filled by the indigenous work force. Due to the specialized skills required in some types of construction, some employees might have to be imported. Communities having a work force with a large diversified job skill base, will retain a larger share of any construction related jobs associated with an energy development activity. Centralized energy distribution systems tend to require more specialized and consequently higher paying jobs. These projects also have a higher employment multiplier potential than do conservation or installation of small decentralized systems.

Use of Indigenous Energy Resources— No community is without its own indigenous resources. Questions here revolve around the economic viability of recovering or extracting energy from that resource. A wide range of such resources were identified by all communities participating in this study. They included: solid waste, gas from waste or biomass, waste heat, geothermal energy, natural gas, hydropower, wind and solar energy. Applications included: district heating, cogeneration, electric production, space heating and cooling, and hot water heating. Users included all sectors of the economy.

Energy/Economic Development Linkage— A portion of energy dollars spent on imported fuels or electricity remain in the community

through energy taxes and local investments by energy distributing companies. How much money actually remains in the community is a function of the type of replacement energy fuel and delivery system. Whether or not these retained energy dollars stimulate economic development is also influenced to some degree by consumer preference.

Purchase of foreign made products will cause dollar outflows from the community. Even savings may be temporarily exported, given a banking institution's investment portfolio and options. The more diverse the community's economic base is, the greater is the potential for retaining a larger share of the energy dollar. A community that takes an active role to curb energy costs, creates a positive climate for economic growth. That community will likely attract more capital than a community with a passive approach to its energy and economic development problems.

Beneficiaries— Ann Arbor, Wichita, and Johnstown judged the success of strategies by the degree to which they assisted lower income groups. There was insufficient data to make any judgement of the economic success of assisting lower income groups. Generally speaking, the saving of energy through conservation of resources among economic groups with low per capita consumption did not have the same positive cash flow impact as energy savings accrued from conservation in business and industry, traditionally high consumers of energy. However, important health, safety and and public benefits accrue from assuring that all income groups have access to adequate supplies of reasonably priced energy.

Larger scale centralized energy projects such as district heating, hydroelectric, waste heat energy recovery appear to provide economic benefits to a broader base of recipients. Those directly hooked into the system realize benefits through lower capital, fuel and maintenance costs. Furthermore, the value of these projects can be "passed through" to other citizens in the community by means of lower cost of services of local government and reduced costs of goods and services from those directly hooked up to the system. Larger systems have the potential for creating numerous construction and operations jobs, while conservation projects tend to marginally increase the business revenues of numerous local suppliers without necessarily creating additional jobs.

The Role of Public Officials—

It would appear, that in those communities where there was high level support from the chief executive such as Lawrence, Erie, Jamestown or Chilton, energy strategies have a higher likelihood of success. For example: Erie County's outreach program was supported by the county executive, local civic leaders, and several TV personalities. With a strong advocacy role by the energy planning department as well, all ingredients were in place for successful implementation of Erie County's Conservation Plan. When a municipality such as Boise, has to build a constituency for its project, it is often difficult to get the project off dead center.

Institutionalization—

In those cases where an energy strategy has been institutionalized for some time such as in Ann Arbor, Boise,

or Nashville, the implementation of a new or related strategy is much easier to sell.

Successes and Failures— Some strategies could not be implemented, but lessons drawn from them can also be constructive. Accomack, Virginia's initial project failed due to a lack of funding from both private and federal sources. The lesson learned here is not simply that both public and private support for energy strategies is needed, but that the both sectors must take positive action early instead of waiting until a major provider of jobs is nearly out of business before reacting.

Almost all of the ten communities had some success. Ann Arbor's assistance to low-to-moderate income people is a good example of improving the quality of life for those with limited income who feel the greatest disruption during periods of high energy costs. Chilton, in addition to its energy efficiency projects, provided employment opportunities for developmentally disabled persons who had been solely dependent on public assistance. They were offered an opportunity to be responsible for a share of their own care, thus providing them with a measure of independence. Jamestown, whose cogenerating district heating project achieved a 30% energy cost reduction for the downtown area, produced such enthusiasm that the initial system will be expanded next year. These are significant success stories.

OVERVIEW

Communities which develop strategies to reduce the amount of energy that they need to import, that is they undertake energy conservation programs or produce energy from indigenous resources, will benefit in real economic terms. This runs counter to the conventional wisdom of the early to mid 70's which inferred that with economic growth came a corresponding increase in energy consumption. This change in the way the linkage between energy and economy are now viewed, requires a reorientation for public officials who may need to deal with energy policy initiatives. In the past when energy initiatives were promulgated at the local level, it was necessary to build a constituency based on goals such as : being in the national interest, protecting the environment, or public safety concerns.

Local governments are now being pressed by financial shortfalls caused by increased competition for the use of limited Federal aid and constraints on the use of the property tax base as a source of revenues. Implementation of measures which place a cap on the amount of revenues that can be produced from taxing real property, such as, proposition 19 or 2 1/2, stimulated interest in developing creative programs for generating local revenues to reduce the cost of government operations.

It was difficult enough for energy officials to sell energy programs in the 70's based solely on energy savings that would be accrued by the locality. Today, it is nearly impossible to do so

in these times of stiff competition for limited financial resources and the perception, by many, that there is no longer an energy crisis. Thus, the selling of an energy program needs to be made on the basis of economic benefits such as the number of public employees that needn't be laid off, or the additional capital projects that contribute to the tax base that can be undertaken. The latest thrust in marketing energy strategies at the community level includes the following: energy efficient municipal operations, energy projects that stimulate economic development by retaining or expanding local business that create jobs, energy projects that provide employment opportunities for those persons currently on the welfare rolls, and projects that upgrade the real property base of the community. Lofty goals? No, these energy strategies have been undertaken to a greater or lesser degree by a number of communities throughout the United States.

PROJECT APPROACH

The Department of Housing and Urban Development (HUD), Office of Community Planning and Development (CPD), Energy Division plays a leadership role in energy conservation, renewable resource and district heating projects. Because of their active involvement in these projects and their extensive networking, they were aware of local energy initiatives that had a positive benefit on economic development. Thus, in late 1983 CPD was authorized to expend \$100,000 of Section 107 Technical Assistance (TA) funds to document local energy strategies which emphasized economic development. Proposals were solicited from interested communities with certain stipulations. The emphasis would be to document

existing strategies or those that had been developed and would be transferable to other communities. These strategies should emphasize the linkage between energy in relationship to economic and community development, and that had been or could be supported by Community Development Block Grant (CDBG) or Urban Development Action Grant (UDAG) funds. It was further stipulated that selection would seek to maximize the geographic distribution of participating communities. The communities would also transfer through workshops or other methodologies, their experiences to other communities.

Additionally, the following guidance was provided to the selected communities. Each participating community should explore the historical context of both energy use and economic growth and development as it relates to the project that HUD was to fund. Each community should describe the economic development and/or energy objectives of their community and to the extent feasible, identify or quantify the benefits of undertaking the projects. Sources of funding and key factors should also be identified whenever possible.

PROJECT PARTICIPANTS

Ten communities were selected to document their economic development and energy strategies and to share their experiences at local workshops. The communities that participated in this project were selected on the basis of proposals submitted to HUD's Office of Community Planning and Development, Energy Division. Strategies are described by the ten participating communities that relate to a variety of activities from holding a

workshop to conducting a marketing study of district heating for a Central Business District (CBD). Furthermore, the information provided ranges from the documentation of an entire energy program of the community supported by detailed cost and energy information to anecdotal information. Appendix A provides a brief summary of each community's project. Appendix B provides a reference to the individual community reports and other supporting information used in the preparation of this report. The communities and their proposed projects detailed are listed below.

- o Accomack, Virginia (B1)
 - Use waste from a financially burdened mill to create energy
- o Ann Arbor, Michigan (B2)
 - Report on an outstanding Comprehensive Community Energy Management (CCEMP) plan
- o Boise, Idaho (B3,4)
 - Geothermal district heating
- o Chilton, Wisconsin (B5)
 - Cogeneration, recycling center, incinerator retrofit utilizing heat output for greenhouses, housing rehabilitation
- o Erie County, New York (B6)
 - Comprehensive energy planning including residential and industrial conservation and evaluation of alternative sources
- o Jamestown, New York (B7,8,9,10,11)
 - Promote energy awareness, provide financial incentives that encourage energy investments, and that increase electric output at a city - owned coal-fired plant
- o Johnstown, Pennsylvania (B12)
 - Waste-to-energy for DHC including reduced energy costs to

keep in the community what is left of what was a very large steel plant

- o Lawrence, Massachusetts (B13)
 - Hydroelectric generation and waste-to-energy/district heating
- o Nashville, Tennessee (B14,15)
 - Choose best of three approaches to heating a new Convention Center and Hotel
- o Wichita, Kansas (B16-23)
 - Conduct workshops and provide technical assistance on energy/economic development

OVERVIEW OF STRATEGIES

The strategies documented here are components of local programs and in some instances, represent the entire program of the communities that participated in this HUD sponsored project.

Research has shown that new and innovative concepts, including those involved in energy management and economic development, follow a typical learning curve with 10 percent of the population immediately adopting concepts as innovators or "trailblazers". The next 20 percent will follow this lead after a concept has been proven. Another 50 to 60 percent will adopt the concept if there is an incentive to do so. The remaining 10 to 20 percent will participate only when left no alternative.

Since it is in the best interest of the community for all members to participate in the energy management process, implementation schemes must be developed to reach each of the groups described above. Thus, information programs are used to stimulate the innovators into action, while mandatory compliance and code enforcement focuses on those groups who must be directed to take

action. Incentives are designed to stimulate the largest percentage of the community into taking action. Both financial and institutional incentives reduce barriers to all groups and smooth the transition to a more energy self-reliant future. (B24)

The strategies described herein are divided into three major groupings: Energy Supply, Energy Conservation, and Economic Development. Energy strategies are further subdivided into central conversion, distributed conversion systems and non-renewable fuels. Central conversion systems that are included in the community projects include: Geothermal district heating, waste-to-energy district heating, coal/waste-to-energy district heating, low head hydroelectric, waste heat district heating, cogeneration, and wind energy conversion. Distributed systems include: Active and Passive solar heating, and solar hot water. Non-renewable fuels include: natural gas well drilling, gas manufacture from waste products and fuel switching. Several matrices (Tables 1-5) have been included in this report to aid the reader in evaluating and examining the results of the studies. The first three matrices illustrate the strategies employed by each community. The last three matrices compare the strategies with the potential benefit and beneficiary. Six of the communities emphasized a supply side approach to stimulating economic development. They were Accomack, Boise, Chilton, Johnstown, Lawrence and Nashville. Four of these communities described operating systems, three of which were district heating. The two communities which stressed an energy conservation approach were Ann Arbor and Wichita. Both

communities, it should be noted, had reported on a comprehensive conservation program patterned after CCEMP. Lastly, two communities presented a balanced program of supply and conservation, they were: Erie County and Jamestown. (B25)

Supply Strategies

Table 1 illustrates the supply strategies that were employed by the communities. Nine of the participating communities undertook at least one supply strategy. Lawrence, Massachusetts utilized the largest number of supply strategies with five. Ann Arbor, Boise, Chilton, Erie County, Lawrence, and Nashville reported on operating supply systems. While Accomack, Johnstown and Chilton described proposed systems. Jamestown's system was in its initial phase of operation as of this report. The most prevalent supply strategy was the use of district heating with seven communities opting for this strategy. Few communities explored the use of renewable resources such as active or passive solar. Ann Arbor, Erie County and Lawrence identified solar demonstration systems as part of their strategies.

Conservation Strategies

Table 2 identifies the energy conservation strategies. Nearly every community included some form of energy conservation as part of a program to stimulate economic development or deal with an economic issue. Ann Arbor, Erie County, and Wichita reported comprehensive conservation programs which they had implemented. The most prevalent strategy was information dissemination and public education. The next most prevalent were energy audits and technical assistance.

ENERGY SUPPLY STRATEGIES

TABLE 1

ENERGY SUPPLY STRATEGIES	ACCOMACK VA	ANN ARBOR MI	BOISE CITY ID	CHILTON WI	ERIE COUNTY NY	JAMESTOWN NY	JOHNSTOWN PA	LAWRENCE MA	NASHVILLE TN	MICHITA KS
PASSIVE SOLAR		X		X				X		
SOLAR HEATING		X								
SOLAR HOT WATER					X					
WIND ENERGY CONVERSION										
FUEL SWITCHING	X							X		
GEOTHERMAL DISTRICT HEATING			X				X			
WASTE-ENERGY DISTRICT HEATING				X	X				X	
COAL/WASTE-ENERGY DIST. HEATING										
HYDROELECTRIC								X		
GAS (NATURAL)					X					
GAS (MANUFACTURED)	X				X					
COGENERATION				X		X			X	
WASTE HEAT RECOVERY/DISTRICT HEATING						X				

ENERGY CONSERVATION STRATEGIES

TABLE II

ENERGY CONSERVATION STRATEGIES	ACCOMACK VA	ANN ARBOR MI	BOISE CITY ID	CHILTON WI	ERIE COUNTY NY	JAMESTOWN NY	JOHNSTOWN PA	LAWRENCE MA	NASHVILLE TN	MICHITA KS
ENERGY AUDITS		X			X	X				X
RECYCLING		X		X						
RESOURCE RECOVERY	X			X				X		
LANDSCAPE IMPROVEMENTS										
REHABILITATION LOANS	X	X	X	X		X		X		X
OTHER FINANCIAL INCENTIVES		X			X	X				
BIKEWAYS/WALKWAYS		X								
BUS SHELTERS		X								
BUILDING INSULATION		X			X				X	
EQUIPMENT INSULATION		X								
EQUIPMENT RETROFIT		X								X
MAINTENANCE		X								
PASSIVE EDUCATION		X			X			X		X
ACTIVE EDUCATION		X			X			X		X
CODE COMPLIANCE		X								X
MASS TRANSIT		X								
TECHNICAL ASSISTANCE					X	X				X
PROGRAM LINKAGE		X								

Economic Development Strategies

Table 3 identifies the economic development strategies employed by the communities..

Financial Incentives— Several definitions would be useful here. Since the largest percentage of the community acts to conserve energy or increase supply when there is an incentive to do so, an obvious strategy employed by nearly all communities is the financial incentive. Financial incentives employed by the communities were designed to improve the financial return on an investment, to reduce the initial cost, or to reduce the risk on an energy project. In providing the incentives, the community seeks to use economic leverage to encourage private investment in capital of equal or greater amounts. For example, Jamestown, NY reported its Local Development Corporation (JLDC) approved five low interest loans in 1984 totaling \$300,000 which leveraged almost eight times that amount or \$2,342,223. Financial incentives included use of seed money (Boise, Chilton), tax abatements (Lawrence), reduced capital costs (Boise, Nashville), rehabilitation loans (Ann Arbor, Chilton, Jamestown, Boise) and loan guarantees. (B24)

Institutional Incentives— In addition to its ability to provide financial incentives, a community has many institutions that can provide incentives. Various departments can participate in a project by granting priorities, removing restrictions, streamlining processes and coordinating with non or quasi-governmental organizations to make the desired energy management strategy easier to implement. Communities can establish special

ECONOMIC DEVELOPMENT STRATEGIES AND FUNDING SOURCES

TABLE III

	ACCOMACK VA	ANN ARBOR MI	BOISE CITY ID	CHILTON WI	ERIE COUNTY NY	JAMESTOWN NY	JOHNSTOWN PA	LAWRENCE MA	NASHVILLE TN	WICHITA KS
NEIGHBORHOOD/COMMUNITY IMPROVE.	X				X	X		X	X	
JOB TRAINING				X	X		X			
INSTITUTIONAL/REGULATORY SUPPORT					X		X	X		
PUBLIC/PRIVATE PARTNERSHIP		X					X	X		
ENTERPRISE ZONES		X			X	X	X	X	X	
FINANCIAL INCENTIVES	X				X	X	X	X		
JOB CREATION						X	X	X		
RETAIN EXISTING BUSINESS/INDUS.	X			X					X	
CREATE NEW BUSINESS/INDUSTRY	X				X					
CAPITAL/OWN COST REDUCTION										
STIMULATE CONSTRUCTION										
LAND USE PLANNING			X					X		
REHABILITATION LOANS	X	X				X		X		
<u>FUNDING SOURCES</u>										
HUD CDBG	X	X		X	X			X	X	X
UDAG	X	X		X				X		
OTHER										
DOE LOCAL/COUNTY/STATE PRIVATE		X	X	X	X	X		X	X	X

purpose districts or redefine existing districts (Nashville, Lawrence and Boise). These special districts are particularly helpful in planning a district heating system. Communities have considerable power to facilitate the implementation of development plans. Through existing authorities or creation of public corporations, the community can provide water and district heating lines, build convention centers, bus stops and pedestrian malls (Boise, Accomack, Jamestown, Erie County, Nashville, Johnstown, Ann Arbor). (B23,24)

RELATIONSHIP OF STRATEGIES TO BENEFITS

As mentioned earlier in this report, any community which utilizes energy conservation strategies or that increases energy supply from indigenous resources will reduce the amount of fuel that it needs to import. This in turn, will reduce the flow of dollars out of the community to some degree. For many communities this was the motivating factor for undertaking some form of energy strategy. It was further anticipated that this reversal of fuel dollar flow would somehow also help communities stimulate economic activity.

A considerable amount of work has been done on a national and regional level that examines the above premise. These studies used a variety of sophisticated techniques including input-output models, dynamic simulations and energy intensity factors. These techniques are useful to illustrate the magnitude and direction of economic benefits that accrue from national or regional energy policies. They may even have some validity when examining the local impacts of a major energy project, such as construction of

a power plant. They have little use at the local level for such small projects as energy conservation or retrofit of power plant to recover waste energy.

Energy Supply/Benefits Comparison

Table 4 illustrates the energy supply strategies and benefits identified by the communities. Of the energy supply strategies examined, it would appear that district heating has the broadest range of benefits, among them reduced energy costs for any group that was hooked into the system (For Example low-income housing in Lawrence and a Hospital in Jamestown). The system also reduced the dollar outflow from the community as it displaced fossil fuels, contained energy, operations and maintenance costs for business, industry, government and other users. In some communities such as Lawrence and Nashville, it was partially responsible for job creation and retention. An ancillary benefit was the improvement in environmental quality and in the quality of life. In those cases where communities were able to quantify the benefit, Lawrence estimated an annual fuel savings of \$5.6 million a portion of which was retained in the community. In Jamestown, the hot water district heating systems yielded a savings of 2.5 MW of thermal load. While in Nashville, the Thermal Transfer Plant saved 1.7 million barrels of oil, which at \$30 per barrel would be over \$50 million. Other communities were less specific about the value of the savings. No estimates of economic development benefits were made.

Other projects worth a brief mention included the Lawrence low-head hydroelectric project which saved \$5 million, created 20 new

ENERGY SUPPLY/BENEFITS COMPARISON

TABLE IV

[illegible]

TABLE IV (continued)

BENEFITS	PASSIVE SOLAR	ACTIVE SOLAR	WIND ENERGY CONVERSION	GEOTHERMAL	WASTE-ENERGY DISTRICT HEATING	COAL WASTE- ENERGY DIST. HEATING	HYDROELECTRIC	GAS (NATURAL)	GAS (MANUFACTURED)	COGENERATION
RETAINS LOCAL INDUSTRY										
<u>CREATES NEW JOBS</u>	x				x	x	x		x	
<u>CREATES JOBS for DISADVANTAGED</u>	x							x	x	
<u>INCREASES ENERGY SELF RELIANCE</u>			x	x	x				x	
<u>REDUCES/DELAYS/ELIMINATES NEED TO EXPAND UTILITY GENERATION CAPACITY</u>										

jobs, and 200-300 man-years of construction labor. Erie County's wind energy system would reduce energy costs for all electric users if the energy were put into the grid. Although not specifically mentioned in the report, the Erie project should receive benefits from having created new jobs and industry, since the wind system was locally manufactured. Chilton's greenhouse and hydroponic gardening will be reported here, although it is as much an economic development strategy as it is an energy supply strategy. Since the greenhouse utilizes passive solar energy, we've elected to discuss it here. The Chilton project focused on job creation for the developmentally disabled by creating jobs for those who have a difficult time being placed in existing job slots. . The project benefited local government by reducing their share of the cost of assisting the disabled. It also created a new local industry for Chilton.

Energy Conservation/Benefits Comparison

Table 5 illustrates the energy conservation strategies and benefits that accrue from them. In contrast to supply strategies, energy conservation strategies yield benefits directly to the population of the community, the energy end users. Furthermore, these strategies do more to assist the elderly and low and moderate income groups than do supply strategies. In Ann Arbor, the home visits program showed that low income families could reduce their energy use from 10 to 30%. The actual dollars saved was \$9,000. This represents a small fraction of the \$234 million that Ann Arbor spends on energy. Erie County had a similar range of programs. They estimated that the annual benefit of their

ENERGY CONSERVATION/BENEFITS COMPARISON

TABLE V

BENEFITS	Energy Audits	Recycling	Rehabilita- tion Loans	Other Finan- cial Incen- tives	Community Improvements	Code Compliance	Building Insulation	Equip. Insula- tion/Retrofit	Maintenance	Education
REDUCE ENERGY COSTS LOW/FIXED INCOME MODERATE INCOME ALL GROUPS	X X X		X	X X	X	X	X X X X	X X X X	X	X X X
REDUCE \$ OUTFLOW										
REDUCE/CONTAIN ENERGY COSTS BUSINESS INDUSTRY GOVERNMENT OTHER				X	X	X				
REDUCE/CONTAIN O&M COSTS RESIDENTIAL BUSINESS INDUSTRY GOVERNMENT OTHER		X								X
REDUCE CONSTRUCTION COSTS RESIDENTIAL BUSINESS INDUSTRY GOVERNMENT OTHER										
REDUCES GOVT. SHARE of PROJECT COSTS										
INCREASES LOCAL SALES										
OPTIMIZES FUEL MIX										
CREATES OR EXPANDS LOCAL INDUS- TRY										

TABLE V (continued)

BENEFITS	Energy Audits	Recycling	Rehabilita- tion Loans	Other Finan- cial Incen- tives	Community Improvements	Code Compliance	Building Insulation	Equip. Insu- lation/Retro- fit	Maintenance	Education
<u>CREATES NEW JOBS</u> <u>CREATES JOBS for DISADVANTAGED</u> <u>INCREASES ENERGY SELF RELIANCE</u> <u>REDUCES/DELAYS/ELIMINATES NEED</u> <u>TO EXPAND UTILITY GENERATION</u> <u>CAPACITY</u> <u>IMPROVES TAX BASE</u>			X	X	X					

energy conservation plan would be \$266.5 million. To achieve those savings would require an investment of \$50 million annually. Benefits from other programs were identified but not quantified. The benefits identified included: retaining local energy dollars, avoiding future costs, increasing the local multiplier effect of local energy dollars, increasing local purchases of energy conservation materials, equipment and services.

Economic Development Strategies/Benefits Comparison

Only two communities provided sufficient information to make the linkage between a specific economic development strategy and benefits. Ann Arbor's Neighborhood Improvement Program identified the linkage to rehabilitating neighborhood centers, walkway construction, and construction of bus shelters. These benefits included increased use of mass transit, improved maintenance of property and a reduction of the number of substandard housing units which in turn affects the real property base of the community. In Chilton which was discussed under supply strategies, employment opportunities for the developmentally disabled were created which reduced the financial burden of local government, which in turn could result in a lower tax burden for the rest of the community.

FUNDING SOURCES

Funding appears to be the greatest impediment to project implementation. Without some form of fiscal resources from either local, state or Federal government agencies, departments responsible for energy or economic development projects have had

difficulty in initiating any activity.

Nearly all communities identified the Federal Government as a funding source for their respective projects. Table III provides a brief summary of all funding sources identified by the localities. The three Federal agencies most frequently cited as a source of financial assistance for energy and/or economic development strategies were:

U.S. Department of Housing and Urban Development (HUD)

U.S. Department of Commerce (DOC) Economic Development Administration (EDA)

U.S. Department of Energy (DOE)

Funding included Community Development Block Grants (CDBG), Urban Development Action Grants (UDAG), Economic Development Administration (EDA) Grants, and Department of Energy (DOE) Grants. CDBG and UDAG were used or proposed for a wide variety of projects. The following provides a brief overview of the localities that identified HUD as a source of funding and the types of projects that were implemented or proposed using CDBG or UDAG. In several instances HUD was identified as a source or potential source of funds but no specifics were provided.

Accomack, Virginia-UDAG-A chipping machine to make wood chips that would be used to produce ethanol.

Ann Arbor, Michigan-CDBG-Housing Rehabilitation, Low Cost and No Cost Home Visit Program for Energy Conservation, Neighborhood Improvements.

Chilton, Wisconsin-CDBG-Housing Rehabilitation, Rebuilding
of an Incinerator, Plans for Waste
Energy Sales.

Jamestown, New York-CDBG-Industrial Revitalization Program.

Lawrence, Massachusetts-UDAG-Waste to Energy District
Heating. CDBG-Housing Rehabilitation.

Nashville, Tennessee-UDAG-Hotel and Convention Center linked
to a District Heating System.

Lawrence also identified HUD as a source of funding for a feasibility
study.

SUMMARY OF FINDINGS

Communities which develop strategies to reduce the amount of energy that needs to be imported to their community will benefit in real economic terms. This is the major finding of a Department of Housing and Urban Development (HUD) sponsored study of the linkage of energy and economic development. The study draws on the experiences of ten communities which are representative of the geographic diversity of the United States; community size, age and composition; urban design configuration; and economic climate. The communities included: Accomack, Virginia, Ann Arbor, Michigan, Boise City, Idaho, Chilton, Wisconsin, Erie County, New York, Jamestown, New York, Johnstown, Pennsylvania, Lawrence, Massachusetts, Nashville, Tennessee, and Wichita, Kansas.

In general, the strategies described in the individual community reports and summarized in this report represent on-going programs. What the findings suggest is that the ability to stimulate economic growth and development through energy strategies does work and that it is an activity that can be initiated by local government. Furthermore, the studies suggest that the potential for success is much greater if the chief executive of the community is visibly involved and there is a broad coalition of local civic and business leaders behind the strategy.

Other findings of importance are:

- o The magnitude of the economic benefit is directly related to fuel mix and the degree of reliance on imported fuel into the

community.

- o Energy dollars saved will not necessarily remain in the community on a dollar for dollar basis. Consumer preference on spending dollars saved, selection of alternative fuels or systems will influence the outcome.

- o Employment of workers required for the construction of new energy facilities may require the import of workers. Employment benefits are a function of job skills required and indigenous skills available.

- o Central supply systems, such as district heating, appear to have the potential for providing the widest range of benefits. Individuals even if they are not directly hooked into the system will benefit via the "trickle down" of energy savings, reduction in costs of locally produced goods and services, or reduction in the costs of municipal services.

- o Conservation strategies do not appear to have as wide a range of benefits as supply strategies. The benefits accrue almost immediately to anyone undertaking these strategies. Low and moderate income and elderly people appear to benefit the most by the conservation strategies described.

- o No community is without an indigenous resource. The key issue for the community is the economic viability of recovering that resource.

Lastly, the community that takes an active role to curb energy imports creates a positive environment for economic growth.

APPENDIX A
AN OVERVIEW OF COMMUNITY ENERGY/ECONOMIC DEVELOPMENT
STRATEGIES
The Case Studies

This appendix provides a brief overview of the energy/economic development strategies described in each community's report to HUD/CPD. A brief overview of the demographic features of each community (limited by the information provided) is included. Other pertinent information has been included to help put the strategy in context. The summaries are presented in alphabetical order.

ACCOMACK, VIRGINIA

Demographics

The Town of Accomack is located in the County of Accomack on the Eastern Shore of Virginia. The Eastern Shore is a peninsula bounded by the Chesapeake Bay on the West and the Atlantic Ocean on the east. The town has a population of 522, while the county's population is 31,268. The town had an unemployment rate of 5.7% in 1979. The county's unemployment rate was 7.4%.

Overview of Strategy

Lewis Lumber and Piling Company was the major employer in the town, regularly employing 70 persons. Since 1979 it has undergone three changes of ownership and in 1984 went bankrupt.

The original strategy focused on Lewis Lumber. The plan was to utilize UDAG assistance to purchase a wood chipping machine. The chipping machine would convert lumber company's wood waste products to wood chips. The wood chips would then be sold to New Church Associates as feed stock in a wood to ethanol

was to be used to secure financing for the non-UDAG portion of the chipping equipment. New Church would use the chips as fuel to initially power its boilers to prepare corn-based ethanol and ultimately shift to an all wood based operation.

Evaluation of Strategy

Several problems occurred which caused the strategy to fail. The purchase of the chipping machine turned out to be ineligible for UDAG assistance. The efforts between Lewis Lumber and New Church to negotiate a contract for the wood chips failed. Failure to secure financing for the project from both government and private sources along with other financial difficulties contributed to the failure of the project.

Several alternate strategies were employed by Accomack County that focused on economic development. They included revitalization of business activities in the Towns of Cheriton and Eastville. An ailing food processing plant was to be renovated to prevent the loss of 200 jobs. The linkage between energy and economic development on these proposed projects was not clearly defined enough to include in this report.

ANN ARBOR, MICHIGAN

Demographics

The City of Ann Arbor is located in southeastern Michigan in Washtenaw County, approximately 35 miles west of Detroit. It has a population of over 100,000 people.

Overview of Strategy

The City of Ann Arbor has been involved in the planning,

development, and implementation of energy programs since 1978. Under the direction of the Community Development Department, energy concerns have been integrated into many Community Development Block Grant activities, as well as into other general city programs. The following is a listing and brief description of the projects undertaken:

- o Rehabilitation Loans- They provide financing for owner occupied and rental units. Low and moderate income homeowners and tenants are assisted directly and residential property owners are provided with incentives to finance code and energy retrofits.

- o Residential Conservation Service- This provides home energy audits for \$10 by local utilities. The audit has been incorporated into the rehab program with the fee waived for lower income persons.

- o Solar Demonstration Projects- A two-year study to design, construct, evaluate and monitor five solar retrofits and conservation projects was conducted.

- o Low Cost/No Cost Home Visit Program-Under a contract with the Ecology Center of Ann Arbor, the City provides assistance and consultation to eligible lower income owners and renters for installation of low cost energy savings devices. It also explains energy conservation measures designed to reduce energy use.

- o Energy Conservation Workshops- Under a contract with the Ecology Center of Ann Arbor, the City provides a number of workshops on a wide variety of energy-related topics focusing on energy conservation.

- o Neighborhood Improvements- A series of small scale projects such as bikepaths, a greenhouse, and installation of a

bus shelter have been completed using CD funds. Coordinated service centers which provide assistance to low income families have also been retrofited with energy improvements.

o Economic Development and Energy- This program focuses on providing weatherization job skills in the building construction field. These job skills can be utilized in private sector employment. The Ecology Center provides energy conservation services to low income groups. These services utilize unemployed individuals who are provided with on-the-job training, while at the same time they provide the weatherization services to low and fixed income people.

o Energy Plan and Program Development- A public awareness program to demonstrate the effectiveness and promote energy conservation.

o Promotion-This aspect of the program focuses on a media program to increase public acceptance and understanding of Ann Arbor's program. It is geared toward publicizing activities and projects via newspaper articles, displays at local shows, design and publications of pamphlets and brochures, and providing technical assistance and referrals as needed.

Evaluation of Strategy

Most of these programs had some link to improving the economic condition of Ann Arbor. Rehabilitation of rental housing with its emphasis on energy conservation and correction of code violation helped stabilize housing costs, minimized the displacement of persons from aging structures, and assisted in providing economic and racial integration in Ann Arbor's older neighborhoods. The

Residential Conservation Service on its own does not have a strong link with economic development, however when viewed in the context of its coupling with other programs, it does provide a basis for making the needed improvements. The Solar Demonstration Project which actually included a mix of both conservation and solar, demonstrated that energy savings on the order of 20% to 70% are attainable. These savings could protect the short term needs of low income persons. However, due to rising gas prices greater savings are needed. Savings on the order of 50% to 75% could provide a greater degree of self-sufficiency and in the case of moderate to upper income groups could free up fiscal resources for discretionary use. The Low Cost/No Cost Home Visit Program focused on the needs of low-income persons. The program resulted in a savings of 10% to 30%. The average person realized a 15% savings in gas use. There was a strong link between the RCS recommendations and an increase the number of conservation actions that were taken. It is difficult if not impossible to measure the success of the Energy Conservation Workshop, since no mechanism existed for providing feedback on actions taken by participants. Neighborhood Improvements focused on the importance of redeveloping, revitalizing and improving the infrastructure that makes up the community. A number of studies have been commissioned and several energy related projects have been implemented, among them a bikepath/safety sidewalk to connect assisted housing to a neighborhood school, erection of a bus shelter for public housing tenants along a major transit line, construction of a greenhouse for winter gardening in a public assisted senior citizens high rise unit, and relocation of a

recycling drop-off station. Funds were also used to make improvements in neighborhood centers. Although not a major contributor to economic development, these infrastructure improvements should reduce the rate of blight, add to the neighborhood stability and help maintain a sound property tax base.

A variety of different approaches could be taken by local government to improve the economic climate of their communities. Ann Arbor has taken an approach which focused on reducing the energy dollar outflow from the community, avoiding future costs and increasing the multiplier effect of local dollars. Energy savings may be converted into consumer purchases or monies saved within the community. The cost of non-renewable resources is currently escalating and will continue to do so. Energy conservation measures reduces the need to purchase these resources and thus, reduces the drain on the community's fiscal resources. Lastly, dollars formerly spent on energy that are re-spent several times in the community bring about more economic activity than those spent only once before they leave the community.

BOISE, IDAHO

Demographics

Boise is located in Ada County in southwest Idaho close to the Oregon state line. Boise is the state capitol and is the fastest growing city in the state. The 1980 population was 173,036. The population is anticipated to double within the next twenty five

years. The greatest increases in industrial growth are expected to be in the areas of retail trade, government and the services industry. Major employers include Morrison-Knudsen Construction Company, Ore-Ida, Boise Cascade Corporation, and Micron Computer Technology. It is expected that new computer industries will move into Boise because of the low cost of energy and a low tax base.

Overview of Strategy

Boise, Idaho has an indigenous energy resource, geothermal energy. The objective of their project was to conduct a workshop for Idaho and nearby Oregon cities on how geothermal energy development could enhance local development efforts.

Geothermal energy has been in use since the 1890's. In 1975 the State of Idaho initiated a program to examine space heating requirements of ten state buildings. This program included the drilling of two geothermal wells. The study concluded that it was both technically and economically feasible to heat the buildings using geothermal energy. The project cost \$1.850 million and had a payback of less than ten years. In 1976 the City of Boise created an energy office to examine the legal and institutional ramifications of large scale development of geothermal space heating for its CBD. The project was funded by a grant from the U.S. Department of Energy. The project included plans for the creation of a Geothermal utility. In 1978, subsequent funding was received from DOE along with matching funds from the City of Boise and the Boise Warm Springs Water District. The project included the renovation of the Water District's pumps and pump house, replacement of existing pipeline, and the drilling of a

new well. The well was non-productive. The City of Boise undertook a series of studies and related projects which included: environmental assessments, market and rate studies, engineering studies, geological analysis, construction of transmission and disposal pipelines, legal studies, confirmation of customers and a retrofit program for building owners.

During the period 1979-1980, the Boise geothermal office pursued a marketing program to stimulate greater interest in developing the geothermal resource. The program could not seem to generate much enthusiasm among local banking institutions, users or potential system operators. Eventually one private investor approached the Geothermal office with a plan to formulate a partnership to drill the wells. The new company was called Boise Geothermal Ltd. The company sold shares to individuals in Idaho and received a loan guarantee from U.S. DOE. Funds were used to drill four wells and construct a pump house. The Boise Geothermal and the City formulated an agreement in which the City would obtain contracts from building owners, while the Boise Geothermal would construct wells for the customers and sell the hot water to the city at a discount of 46% below gas prices. Fifteen buildings are currently being heated with energy from the geothermal system. The buildings represent a mixture of municipal, private and institutional structures. There are plans to add several additional buildings to the system.

Although geothermal energy is considerably less expensive than natural gas, some buildings will not be able to be retrofited. For example, in buildings where extensive energy conservation

measures are being employed the energy savings are not as great and thus, the payback periods are not as attractive. In addition, there are some buildings where it does not appear technically or economically feasible to retrofit a heating system.

Evaluation of Strategy

Boise found that the development of geothermal energy for space heating required Federal grants at project inception and continued municipal support until a sufficient number of customers were on line. It was also noted, that the energy payback in both retrofitted and new buildings was substantial, with paybacks as low as six (6) months. The linkage between geothermal development and economic development in the central business district (CBD) was not strong. The local officials felt that the district heating project did contribute to their economic development efforts.

The City of Boise conducted its workshop and examined the history of the project, as well as the technical and economic aspects of geothermal space heating. Participants concluded that obtaining the financing for such projects is a greater problem than the engineering, design, and construction. The technical aspects of system construction is the low risk item, while well drilling and continued availability of the geothermal resource is associated with high risk. Geothermal energy's principal competitors, gas and electric do not appear to be associated with any risk of availability. Lastly, it does not appear that anyone

associated with the project is making any large profits. This apparently has never been a motivating factor in becoming involved. The benefit of geothermal use are returned to the community in the form of a guaranteed supply of an indigenous resource and some stability in the rate of growth of energy costs.

CHILTON, WISCONSIN

Demographics

Chilton is located in Calumet County in the eastern central part of the state of Wisconsin, close to Sheboygan. Its population is approximately 3,000. Chilton is the county seat of Calumet County. Chilton has 44 units of public housing and 30 units of private housing that are being used to house low-to-moderate income families and elderly persons. Other important aspects of community life which influenced the selection of the strategies include, the Regional Learning Center and the New Hope Center for training the developmentally disadvantaged.

Overview of Strategies

Previous successes in the area of housing rehabilitation prompted Chilton to seek additional CDBG funding for additional housing rehabilitation and funds to repair and remodel the 60 ton per day incinerator which had been inoperative for the past three years. The town confronted with a landfill problem, needed to return the incinerator to its operational status. The City authorized the use of funds to determine if the incinerator could be put back into operation and at what cost. The project took on greater significance when the study was expanded to determine if

the incinerator heat loss could be used in a hydroponic gardening operation. Studies confirmed that hydroponics were indeed profitable and could work in the cold climate of Wisconsin.

The incinerator study showed that the incinerator could be modernized and that with proper operation and maintenance, it would provide the community with a long-term reliable waste disposal system at reasonable cost. The study also showed that the potential did exist for substantial heat recovery, far in excess of that needed by the greenhouse operation. Enough heat existed to provide energy for some other industrial purposes. In order to achieve peak efficiency in the operation of the incinerator, the study indicated that recycling of natural resources such as glass, plastic and metals would not only be practical but desirable. Recycling reduces the incinerator load, reduces bulk ash and thus, requires a smaller landfill. The incinerator waste energy recovery was seen as a potential catalyst for economic development via creation of new industries which could take advantage of low cost energy, and thus create a base of new permanent jobs. An additional by-product identified was the generation of electricity which would power the incinerator motors and lights, and the greenhouse growing lights and motors.

Evaluation of Strategy

The proposed project received the 1982 HUD National Merit Award for its use of innovative ideas and concepts in the use of Block Grant Funds. A three year grant was awarded to Chilton on the basis of their grant application. Under the housing

rehabilitation program, more than 15% of the homes requiring rehab have been completed. No community has ever done more than 10% before under HUD's CDBG program.

The incinerator retrofit began in the spring of 1982 and it commenced operations in January 1983. The heat recovery and electric generation costs were too expensive to undertake without an industry to utilize the excess energy.

The greenhouse project was initiated for two reasons. The first, was to create vocational opportunities for severely handicapped persons and the second, to generate increased revenues for the New Hope Center. This later goal would make the Center more self-sufficient and less dependent on the County for fiscal resources. Four persons are now permanently employed in the greenhouse, while 25 handicapped persons are being trained on a daily basis on the various aspects of greenhouse work. Eleven handicapped persons completed training in 1983 and are employed in competitive industry. The greenhouse project was undertaken without the link to the incinerator. As New Hope discovered, the greenhouse effect generated more heat than was actually needed for the hydroponic gardening operation. What wasn't anticipated was the increased need for electricity for lighting during the winter growing season--lettuce needs 14 hours a day of light. The greenhouse has been fairly successful considering it has only been in operation two years.

The resource recovery facility has also had some measure of success, outgrowing its current space. New Hope also staffs this

facility with five persons and a manager. Local industry is participating in this project by providing a paper bailer, plastic shredder, a glass shredder and free equipment maintenance. In general, all of Chilton's goals have been met, except for the waste energy recovery aspect of their project.

ERIE COUNTY, NEW YORK

Demographics

Erie County is located in the southwestern part of New York State on the shore of Lake Erie. It includes the City of Buffalo as its major population center. Its 1980 population stood at 1,015,000, which made it one of the largest study areas included in the project. Erie County's unemployment was 16% in the fall of 1982. The unemployment rate in the City of Buffalo was 12.1%, during the same period. Nationally unemployment was 8.8% and New York State unemployment was 8.1% during the same period. While geographically, culturally, commercially and politically the county has been tied to the northeast, its economy has been linked to midwestern steel and auto industries. It has also been linked to the mid-continent's ore and coal fields by its proximity to the Great Lakes. Thus, Buffalo and Erie County are confronted with similar economic problems and transitional difficulties posed for midwestern cities. The net result has been high levels of unemployment among the traditional workforce.

Overview of Strategy

Erie County's Energy Conservation Policy Plan recommends eight policies and 29 implementing strategies to help establish an energy efficient future for the county. The policies include

the following:

- o Foster and support residential energy conservation.
- o Encourage the efficient use of energy within the production and distribution of goods and services.
- o Promote energy conservation as means to help preserve farming as cost effectively as possible.
- o Support the development of indigenous natural gas resources.
- o Support the development of wind power.
- o Support the use of active solar domestic hot water and passive solar heat gain in new and substantial reconstruction.
- o Support the development of refuse-to-energy projects.
- o Insure the delivery of adequate supplies of conventional energy sources at the least possible price.

Evaluation of Strategies

These policy statements are supportive of the economic development goals of the county. The following is brief overview of energy programs that have a link with the County's economic goals. Residential conservation programs have been supported over the past three years. Reduction in home heating costs stabilize the costs of energy to those on fixed incomes, which in turn helps control the use of public funds for welfare assistance. Industrial conservation programs have focused on providing free audits and financial analysis of the potential return to an industry for making energy conservation improvements. Nearly 300 industries have availed themselves of this service. The county has demonstrated the feasibility of using the their indigenous

resources. Two examples are the construction of a 600 kw wind generator, that was designed and manufactured in Buffalo and the drilling of a natural gas well. In addition, the county completed a study of a solid waste fired steam heating system for its new correctional facility. The City of Buffalo is looking at solid waste as a means of supporting a district heating project in its CBD. On the down side, statewide redistribution of energy from Niagra Hydropower, loss of Bethlehem Steel as a major coal supplier, and electric rate increases threaten the economy of the County.

JAMESTOWN, NEW YORK

Demographics

Jamestown is located in Chautauqua County in southwestern New York in close proximity to the Pennsylvania State Line. Jamestown is the regional center for Chautauqua County and serves a retail market of nearly 175,000 people and a wholesale market of well over 200,000 people. The urban area includes 53,000, and the city itself includes 40,000 people. Founded in 1860, the city has had to modernize and innovate to retain its advantages for industrial location and expansion. Due to its climate and long standing energy advantage from local hydropower, changes in the economics of energy in the 1970's led to the incorporation of an energy strategy as part of the overall economic strategy of "people working together".

Overview of Strategies

Jamestown has received world-wide recognition for its innovative strategies. It developed the Jamestown Area Labor Management

Committee (JLMC) which has enabled them to increase productivity and provide a management climate conducive to retaining and attracting industry. Along with the JLMC, there have been similar joint public and private efforts in the city's extensive physical redevelopment. The Chautauqua County Industrial Development Agency Program for energy loans and technical assistance provides free services of Energy engineers or consultants to perform in-plant technical studies. A revolving loan fund is included in the industrial energy management program. It provides attractive interest rates and is a primary source financing for small rapid payback, energy intensive projects. It also provides attractive financing for larger projects which can be leveraged with other public/private funding sources. In the commercial sector, a program similar in design to the industrial sector program is available to target commercial properties in the city's CBD. The program includes low interest loans to business. A residential strategy has been developed which includes five residential programs in the context of rehabilitation. They include: a residential loan subsidy program for both owner occupied and rental units, a residential grant assistance program which focuses on code violations and is of particular benefit to low income residents, a scattered site rehab program, a program to stimulate new construction, and a code enforcement program.

Evaluation of Strategy

Lastly, a major achievement in the city's energy and economic development strategy was the new pilot district heating and cooling (DHC) system. The project consisted of retrofitting an abandoned coal-fired electric power plant to use its waste heat

and hot water. The plant serves a 130-bed hospital, a private manufacturer and two municipal garages totalling 2.5 MW of thermal load. This project has been so successful in its first year of operation that it has generated community wide support for a planned expansion to 15 MW.

JOHNSTOWN, PENNSYLVANIA

Demographics

Johnstown is located in Cambria County in southcentral Pennsylvania. Its 1980 population was 183,263, a decline of nearly 2% from 1970.

Overview of Strategy

Johnstown, Pennsylvania and the other localities in the region have been pursuing a policy of economic diversification to make the region less reliant on the coal and steel industries. These industries have been the mainstays of the regional economy and their dominance have made the region sensitive to their cyclic nature. The stagnation and decline of these industries has inhibited job creation especially among the younger population.

Current economic development objectives for region include:

- o Encourage small enterprise development by focusing on those existing businesses interested in expansion.

- o Diversify the economic base by attracting new businesses from outside the immediate region.

- o Encourage economic development in areas already sustaining a business or industrial infrastructure.

- o Encourage stabilization of the coal and steel industries within this larger framework, the City of Johnstown has some

specific local objectives for the City and its CBD.

Evaluation of Strategy

A major component of the economic development plan is the proposed waste-to-energy plant. As viewed by Johnstown the new energy plant would aid in diversification efforts by creating a new energy related industry, which in turn would sustain a level of permanent jobs. Several of the ideal energy plant sites are located in areas where there is an existing industrial base and thus, a potential client base for the energy. Several other features of the proposed energy plant's service area would be the CBD and the area's coal and steel industries. Lower cost energy would help to attract new businesses to the CBD which in turn, would help stabilize Johnstown's growth. An expected environmental benefit associated with this project would be to extend the life of the landfill. Residents and business should also benefit by a lower growth rate for disposal costs.

LAWRENCE, MASSACHUSETTS

Demographics

The City of Lawrence, Massachusetts is located in the northeastern part of the state about 26 miles north of Boston and 3 miles from the New Hampshire border. With only 6.7 sq. miles of land, Lawrence has always had a dense concentration of people and buildings. In 1980, Lawrence had a population of 63,175. Of all families living in the city, 17% were living below the poverty level. Approximately 26,000 residents over the age of 16 were employed, primarily in blue collar jobs. Lawrence has almost

26,000 housing units, nearly 10% of which are vacant. Gas is used to heat 54% of all housing units, with fuel oil or kerosene comprising 36% of the home heating fuel. In low income neighborhoods over 70% of the units rely on gas space heaters. Most of the city's housing units are wood frame "three deckers".

Overview of Strategy

Lawrence, Massachusetts, like many other cities in the United States went through a period where rising energy prices and shortfalls of supply required that communities take a lead role in gaining some control over energy consumption. In 1979, the U.S. Department of Energy (DOE) awarded a grant to the New England Innovation Group (NEIG) to assist Lawrence in preparing an energy development program. NEIG coordinated a four-month design effort which involved the Mayor's Office, the local utility, the Lawrence Housing and Community Development Office, and outside consultants. The design effort resulted in a document "Lawrence Economic Development/Energy Program"---a strategy for action.

The strategy was not comprehensive. It did however, recognize that local governments were perhaps more suited than state or Federal government to dealing with energy concerns on the basis of targets for opportunities. The City focused on some immediate opportunities and identified a menu of other activities that could be undertaken over the long term to achieve some measure of local energy self-reliance. The program also attempted to establish some linkages with other local objectives such as community and economic development. The strategy encompassed

conventional, renewable and alternative energy technologies as well as, energy conservation. In order to strengthen the strategy's relationship to economic development concerns, the City and NEIG sponsored a workshop in 1982, entitled " Economic Development Through Energy Initiatives".

The strategy consisted of the following components:

- o An energy profile.
- o A plan for a municipal energy office.
- o Municipal and industrial boiler fuel switching opportunities.
- o Methods for financing residential energy improvements.
- o A plan for establishing a not-for-profit organization to train residents in emerging energy-related jobs.
- o A design for a demonstration project to test the effectiveness of five passive solar retrofit technologies that are applicable to three decker structures.
- o A community outreach and education program on energy conservation.
- o A strategy for networking among all participating parties.
- o District heating opportunities from existing boilers and future resource recovery facilities.
- o A comprehensive listing of actions which the city could undertake to conserve or produce energy

The Community Resource Recovery/District Heating System was perhaps the largest and most noteworthy project undertaken by Lawrence and one which had the most far reaching consequences. The industrial sector uses 37% of all energy consumed in the

city, 75% of which is oil. The District Heating Project was the component of a larger city program to revitalize the Arlington/West section of the city. Within that section is the Malden Mills, one of the city's largest employers. The Malden Mills, like many of its counterparts in the industrialized north, have been affected by high energy prices, competition from the labor and cheap fuel of the south, and antiquated plant and equipment. By 1980, the Mills had reached a point of bankruptcy. The Mills in collaboration with community and economic development officials and input from the Energy Coordinator, developed a plan to streamline manufacturing costs and avoid closure. With \$4.5 million in UDAG funds to assist the company in its \$16 million renovation, a series of energy-related improvements were undertaken as part of the project. Nearly \$7 million in energy related improvements were made. The major component of the energy related improvements was the refurbishment of the Powerhouse. This facility became one of the major components of the community district heating system.

Evaluation of Strategy

In the City's own view, the strategies yielded a mixture of successes and failures. This result was foreseen in the strategy itself. Four major areas served as impediments to a full realization of the projects encompassed by the strategy.

- o The depressed local and national economy of the U.S. in the early 1980's.

- o Proposition 2 1/2, a local property tax reform.

- o The drop in recent years in the price of fuel.

o The scaling down of resources from the U.S. Department of Energy.

High inflation combined with high interest rates of the early 1980's, hindered both public and private investments in projects requiring major capital investments. Lack of investment capital coupled with technological uncertainties and lack of institutional familiarity with certain technologies, specifically hindered certain proposed projects.

The decline of energy prices through the present time, coupled with the lack of public concern regarding both price and availability has made advocating energy conservation and production projects difficult.

The greatly diminished role played by U.S. DOE as an advocate and catalyst for local energy activities has also hindered further progress. DOE, nonetheless, provided local government with a frame of reference in regard to basic information and energy policy development. DOE also provided the financial resources for undertaking projects where the technological risks were high and the returns were uncertain.

In spite of the above constraints, the City of Lawrence considers that they had an overall success in meeting their stated goals.

The tax reform law which mandated a cut in property tax revenues forced older municipalities to make drastic tax cuts and make appropriate changes to cope with the resulting shortfall. These changes included cuts in new service, capital projects and

existing municipal operations. When suggested energy strategies were pitted against public safety services for a share of scarce local resources, new energy-related expenditures invariably lost out.

NASHVILLE, TENNESSEE

Demographics

Nashville is located in central Tennessee. Its 1980 population was 477,811, a 6.7% increase over 1970. It has a highly diversified mix of commerce and industry, education and government. An added asset is a progressive agricultural community in the surrounding area. Downtown Nashville rates in the top 50 retail markets in the U.S. The relative strength of the area's economy can be observed through its unemployment statistics, which in 1984 were 5.3%. Tennessee was 10% and the U.S. was 8.4% during the same reporting period. Some of the area's largest employers include: Opryland, USA, Tennessee State Government, Metropolitan Nashville/Davidson County Government, Vanderbilt University, AVCO Aerostructures and E.I. DuPont de Nemours & Co.

Overview of Strategy

The City of Nashville has pursued a district heating and cooling strategy using solid waste as a fuel. The project has been in place for over a decade and is currently planned to expand service by 50%. The HUD technical assistance grant was used to help document a strategy for use in a marketing effort for system expansion. A recent boom in construction in the CBD, spurred in part by the use of CDBG and UDAG funds has created a potential

market for energy from the district heating and cooling plant. The strategy is focused in part, on the feasibility of serving a UDAG assisted hotel and convention center from the expanded Nashville Thermal Transfer Corporation district heating and cooling system. Specifically, the strategy included a description of the existing system, a description of the expansion plan, guidelines for service to new customers, problems and issues associated with the expansion and a cost analysis. A detailed feasibility and cost analysis of the UDAG assisted convention center and hotel along with the capital costs and energy savings of serving these buildings is also included.

Evaluation of Strategy

It was felt that the strategy document is useful marketing tool. It was also timely to have this document prepared in light of the planned expansion of the Thermal Transfer facility in the near future. With the existing plant capacity largely committed, marketing of the expansion capacity has not been of interest or necessity until recently. The strategy document helps the marketing efforts by presenting capital cost and energy savings possible through the use of the Thermal Transfer facility. The main problem encountered is not the availability of capacity, but such concerns as, will the lines and capacity be in place when needed by the building owner and operator. Nashville has experience some problems because of EPA sanctions, which caused construction delays. These delays may have convinced some developers to proceed with alternative plans. The availability and planned expansion of Nashville's downtown district heating

and cooling system has been closely linked with economic development objectives in the city core. Current users of the Thermal Transfer System have demonstrated that energy from district heating can reduce capital and maintenance costs for office buildings. Two obvious benefits that accrue to developers and building operators are first, the elimination of capital costs associated with in-house heating and cooling systems and secondly, the costs associated with the operation and maintenance of heating and cooling equipment is also considerably reduced. Furthermore, the availability of lower cost energy has helped make downtown Nashville competitive with suburban locations and office markets in other cities. Additional benefits accrue to Nashville in the form reduced land fill costs and land fill acreage. Studies of new and existing buildings other than those currently served, indicate sufficient additional load in the downtown area to justify a 50% expansion of the system. A cogeneration facility is being added to the plant, allowing for the sale of electricity to reduce the cost of incineration.

WICHITA, KANSAS

Demographics

The City of Wichita is located in southcentral Kansas. Its 1982 population was 279,835. Unemployment was 4.6% in 1984.

Overview of Strategy

The City of Wichita chose to present its strategy in terms of a workshop agenda, providing experts to describe how to develop and carry out each of the elements of an overall strategy. The workshop was designed to provide a framework for exploring the

relationship between energy and economic development activities. Energy Place, a public information and energy-related testing and research facility operated by the City was the operating agency for the workshop. The development of the workshop was divided into two phases. The first was devoted to the planning, promotion, and operation of a regional meeting. Interest in the workshop, on the basis of responses to the mailings was high, actual attendance was low. Greater lead time and fiscal resources it was felt would have yielded a higher level of attendance. The second phase of the program was linked to the workshop itself. Persons attending could request technical assistance. Only three attendees requested assistance.

Workshop topics included the following:

- o Public Awareness Programming
- o Developing Community Energy Plans
- o Energy Efficiency and Construction Codes
- o Utilizing Energy Audit Programs
- o Developing Funding
- o The Economics of Conservation

Evaluation of Strategy

The following summarizes the findings of this workshop. It should be noted, that the City of Wichita did not constrain the attendees to the material and they were more or less free to explore anything they wished. All participants agreed on the importance of both short and long term considerations regarding energy. The cost, type, availability and stability of energy supply is critical to the needs of every locality. They also

agreed despite the abundance of "real world" information, certain areas of critical concern are at best sketchy in resource availability and often is contradictory. Continued price increases and the need for information on alternative technologies will make energy planning more critical than ever. During the workshop, participants had an opportunity to review several excellent examples of important elements in any energy strategy that might be undertaken by a locality. Of particular value is Wichita's Local Energy Office Operations Manual, the Energy Policy document and the Comprehensive Energy Conservation Program report prepared by Wichita State University. Wichita has seven years of experience in providing energy services to its population. Many of the projects can serve as models for localities to emulate.

APPENDIX B REFERENCES

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